IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No.	:	10/591,920	Confirmation No. 5381
Applicants	:	Yoshito TOBE et al.	
Filed	:	November 22, 2004	
Title	:	MOLECULAR-WIRE TYPE FLUORESCENT CHIRAL SENSOR	
Group Art Unit	:	1797	
Examiner	:	David G. Weisz	
Customer No.	:	28289	

DECLARATION UNDER 35 U.S.C. §1.132

I, Dr. Yoshito Tobe, declare and say as follows:

1. I obtained a Bachelor of Engineering degree from Osaka University in 1974. I obtained a Master of Engineering degree from Osaka University in 1976. I obtained a Ph.D. degree in Engineering (in synthetic chemistry) from Osaka University in 1979.

2. From 1979-1983, I was a Research Associate with the Faculty of Engineering Science at Osaka University. From 1983-1992, I was an Assistant Professor with the Faculty of Engineering Science at Osaka University. From 1992-1998, I was an Associate Professor with the Faculty of Engineering Science at Osaka University. From 1998 to the present, I have been a Professor in the Graduate School of Engineering Science at Osaka University.

3. My primary work has included creating new materials which have novel structures, and to reveal the properties based upon structural features, including projects relating to Extended pi-Electron Systems and Precise Molecular Recognition.

4. I am familiar with the subject matter of U.S. Application Serial No. 10/590,920, of which I am an inventor. Also, I am familiar with the rejection of claims 1-7 under 35 U.S.C. §103(a) as being unpatentable over Kim et al., "Ion-Specific Aggregation in

Conjugated Polymers: Highly Sensitive and Selective Fluorescent Ion Chemosensors", *Angew. Chem. Int. Ed.* (2000) 39, No. 21, 3868-3872, in view of Naemura et al., "Temperature Dependent Reversal of Enantiomer Selectivity in the Complexation of Optically Active Phenolic Crown Ethers with Chiral Amines", Chem. Commun. (1996) 2749-2750. In response to this rejection, I set forth my opinion and comments below.

5. In Naemura et al., for sensing the enantiomer selectivity, the absorption of light, which is proportional to the rate of the complexation of crown ether with a chiral amine, is measured. In Kim et al., for sensing the ion, the aggregation phenomenon of the host molecules is measured as the absorbance or the fluorescence quenching, but it cannot be expected what is proportional to the aggregation. On the other hand, in the present invention, the quenching behavior in emission of the host polymer molecule is measured for sensing the enantiomer selectivity, and the quenching behavior is not associated with the aggregation of the host polymer molecule. In my opinion, one having ordinary skilled in the art can easily understand that the absorption phenomenon, the aggregation phenomenon, and the quenching phenomenon are different. Thus, the sensing mechanisms in Naemura et al., Kim et al., and the present invention are completely different from each other.

The Office Action asserted that there is motivation to combine the molecular structure capable of realizing the absorption of light which is proportional to the complexation rate (i.e., the crown ether of Naemura et al.) with the molecular structure capable of inducing the aggregation phenomenon of sensor molecules (i.e., the polymer of Kim et al.), thereby designing a chiral sensor in which the absorption of light, which is proportional to the complexation, or the aggregation phenomenon is not utilized for sensing. However, the Office Action does not explain why one having ordinary skill in the art has motivation to combine such different sensing mechanisms (i.e., the absorption of light and the aggregation phenomenon) so as to sense the chirality by using further different sensing mechanism, that is, the quenching in emission of the fluorescent molecular wire.

In my opinion, in order to achieve a high sensitivity that could not have been attained by conventional low molecular weight sensors, one having ordinary skilled in the art would not have reasonably been expected to combine the sensing mechanisms of Naemura et al.

and Kim et al. In general, when the sensing method with a high sensitivity is employed, the sensing has to be performed in the condition of low concentration of the target or sensor molecule, so that the complexation rate tends to be lowered. Therefore, in my opinion, one having ordinary skilled in the art does not design a molecular sensor with a high sensitivity based on the sensing method utilizing the absorption and emission phenomena which are proportional to the complexation rate. That is, there is no motivation to combine the molecular structure of Naemura et al. with polymer of Kim et al.

Furthermore, as seen from new claim 8, the fluorescent molecular wire of the present invention has also an improved asymmetry recognition ability compared to a monomeric compound having the same structure as the optically active substituent. To this day, there is no generally accepted theory for the improved effect of the asymmetry recognition ability. Therefore, in my opinion, the fluorescent molecular wire of the present invention would not have been obvious over Naemura et al. and Kim et al. This feature of the present invention can be explained with reference to Fig. 4 of the present specification (see Example 18 on pages 36 to 37).

In particular, the features of the present invention recited in new claim 8 are (i) enhancement of detection sensitivity for a substrate to be detected, (ii) achievement of signal conversion to increase selectivity of chiral sensor at the chiral recognition site compared to the corresponding monomer and to amplify the increased asymmetry selectivity, and (iii) simultaneous achievement of (i) and (ii). In view of the technical level at the filing date of the present invention, in my opinion, it would not have been easy to achieve even the feature (i), and even more the feature (ii).

I declare further that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements are made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment or both, under Section 1001 of Title 18 of the United

States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Dr. Yoshito Tobe
Date November 19, 2009